

# EUROPEAN PATENT OFFICE

## Patent Abstracts of Japan

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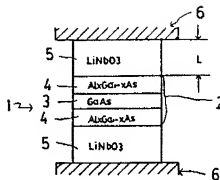
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TITLE : METHOD AND APPARATUS FOR  
FREQUENCY MODULATION  
SEMICONDUCTOR LASER



ABSTRACT : PURPOSE: To accurately and simply obtain a variation in a thickness of an active layer of a semiconductor laser by electrically controlling the thickness of the active layer of the laser by utilizing the piezoelectric property of a crystal having a piezoelectric property.

CONSTITUTION: The thickness of the active layer 3 of a semiconductor laser 2 is electrically controlled by utilizing the piezoelectric property of a crystal 5 having a piezoelectric property to modulate the frequency of the laser 2. For example, when a double hetero junction type  $Al_xGa_{1-x}As$  semiconductor is used as the laser 2 and  $LiNbO_3$  is used as a piezoelectric crystal 5 to form a semiconductor laser element 1, the crystal 5 is integrated with the laser 2 by epitaxial growth or bonding. The element 1 is interposed between a pair of holding jigs 6, and the thickness of the crystal 5 is controlled to maintain a predetermined interval at the jigs 6 to modulate the frequency of the laser oscillation light.

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